THE IDENTITY OF CIRCAEA CANADENSIS AND C. INTERMEDIA.

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In 1915 the present writer pointed out [1] that the Alleghanian plant which has long passed in America as *Circaea lutetiana* L. is not that species, but is rather *C. latifolia* Hill, Brit. Herb. 138 (1756). At that time he did not enter into a discussion of the other species of *Circaea* in eastern America, wishing to make further studies of the plants before pronouncing upon their identities.

Besides the common *C. latifolia* of deciduous woods from western New Brunswick westward and southward, we have the more northern *C. alpina* L. which differs in very many characters from *C. latifolia*, and a third plant somewhat intermediate both in size and technical characters between the two, the plant which is passing in our manuals as *C. intermedia* Ehrh. Beitr. iv. 42 (1789). That this third plant is identical with the European *C. intermedia* there seems little question, several sheets of European specimens showing no characters by which the American and European material can be separated. This plant, which is related to *C. latifolia* and to *C. lutetiana* in having the fruit 2-celled (as contrasted with the 1-celled fruit of *C. alpina*), and the root-stock slender (as contrasted with the tuberous-thickened root-stock of *C. alpina*) and comparatively large flowers, differs at the same time from *C. latifolia* in several definite characters. Its stems are comparatively weak and succulent; the leaves pale green and flaccid, as in *C. alpina*, broadly ovate and usually cordate, with very prominent sharp dentation; the petiole channeled or distinctly margined; the fruiting pedicels merely spreading or only slightly deflexed; the disk inconspicuous and not prolonged (as contrasted with the definitely prolonged cup-like disk of *C. latifolia*); and the mature fruit 1.5–3 mm. thick, including the long soft trichomes, and not corrugated (as contrasted with the strongly corrugated fruits of *C. latifolia* which are 3.5–5 mm. thick, including the strongly hooked bristles).

That the three species are perfectly distinct there can be no question, although in Europe *C. intermedia* has sometimes been considered a

[1] Rhodora, xvii. 222 (1915).

possible hybrid between *C. alpina* and *C. lutetiana*. In eastern America the range of our three species does not coincide and there is little to suggest hybrid characters. *C. latifolia* is an essentially southern species, reaching its northeastern limit in southern and eastern Ontario, southern Quebec, southern Coos County, New Hampshire, central Maine, and southwestern New Brunswick. *C. alpina* is a boreal species, extending from southern Labrador to Alaska and southward across northern New England and northern New York, becoming local in southern New England and along the mountains to Georgia, and westward in the Great Lake region, etc. *C. intermedia*, although credited with a broad range in the 7th edition of Gray's Manual, proves to be a rather local plant, characteristic of rich alluvial woods from Bonaventure County to Lake St. John, Quebec, and southward to Nova Scotia, Cumberland County, Maine, Cheshire County, New Hampshire, and Berkshire County, Massachusetts. In the greater portion of its range *C. intermedia* is not coincident with both *C. alpina* and *C. latifolia* and it seems to be unquestionably a true species which combines some of the characters of the other two. That the plant should not, however, be called *C. intermedia* becomes apparent upon examining the plate of *Circaea* in Hill's Vegetable System, x. t. 21 (1765); for there the left hand figure on the plate is a beautiful representation of the Canadian and New England plant which is identified with *C. intermedia*, illustrated as a new species, *C. canadensis*, and given the very distinctive English name "Toothed Enchanters Nightshade" on account of the salient teeth of the broadly cordate-ovate leaves. Not only in its habit and foliage does the plate clearly show the American *C. intermedia* but the flowers are of the correct size and the fruiting pedicels merely spreading.

This species, *C. canadensis* Hill, was described with "toothed" leaves, a "native of North America; a Plant of 10 inches high, flowering in August. The Stalk is green; the Flowers are white, with a dash of crimson." The crimson dash referred to comes from the crimson calyx which is ordinarily strongly contrasted in *C. canadensis* (*C. intermedia*) with the white petals. *C. canadensis* Hill (1765) thus antedates by 24 years *C. intermedia* Ehrh. (1789), and under the earlier name the species should be known. Whether Hill's *C. canadensis* was supposed by him to have anything to do with the *C. canadensis, latifolia, flore albo* of Tournefort [1] which was the basis for the Linnean

[1] Tourn. Inst. 301 (1700).

C. lutetiana, β. canadensis[1] is not clear for he made no reference to earlier publications; but since Hill's definite use of the name was apparently the first post-Linnean use of it as a specific name there is no reason why it should not stand, regardless of what the pre-Linnean plant and the Linnean variety, to which Hill did not refer, may have been.

In studying the genus *Circaea* in eastern America the writer has found the characters separating our species much more definite than are generally ascribed to them, and it may be of use to others to have the following synopsis:

A. Stem firm, 0.2–1 m. high: leaves dark-green above, rather firm, oblong-ovate, shallowly undulate-dentate, rounded or merely subcordate at base, on subterete petioles: leading racemes becoming 0.7–2.5 dm. long in fruit: mature pedicels strongly reflexed: calyx-lobes 1.8–2.6 mm. broad: disk cup-like, prolonged about 0.5 mm. above the perianth: anthers 0.7–1 mm. long: stigma subcapitate, shallowly 2-lobed: mature fruit compressed-pyriform, with 3–5 corrugations on each face, including the strong hooked bristles 3.5–5 mm. thick.....1. *C. latifolia.*

A. Stems rather weak and succulent, 0.4–4.5 dm. high: leaves pale-green, flaccid, ovate, coarsely sharp-dentate, cordate or subcordate (rarely only rounded) at base, on channeled or margined petioles: leading racemes becoming 0.15–1 dm. long in fruit: mature pedicels spreading or only slightly reflexed: calyx-lobes 0.8–1.7 mm. broad: disk inconspicuous, rarely at all prolonged: anthers 0.2–0.8 mm. long: stigma deeply cleft: mature fruit club-shaped to slender-pyriform, not corrugated, including the soft hairs 1–3 mm. thick. B

B. Root-stock slender, scarcely tuberous-thickened: calyx-lobes 1.2–1.7 mm. broad: petals 2.3–3.5 mm. long: anthers 0.5–0.8 mm. long: fruit unequally 2-celled, including the long trichomes 1.5–3 mm. thick.....2. *C. canadensis.*

B. Root-stock tuberous-thickened: calyx-lobes 0.8–1.2 mm. broad: petals 1.2–2.5 (rarely 3) mm. long: anthers 0.2–0.3 mm. long: fruit 1-celled, including the very short trichomes 1–1.5 mm. thick. 3. *C. alpina.*

C. LATIFOLIA Hill, Brit. Herb. 138 (1756); Fernald, RHODORA, xvii. 223 (1915). *C. lutetiana* of American authors, not L. *C. lutetiana*, var. *canadensis* of early American authors, perhaps of L. *C. lutetiana*, var. *quadrisulcata* Maxim. Prim. Fl. Amur. 106 (1859). *C. quadrisulcata* (Maxim.) Franchet & Savatier, Enum. Pl. Jap. i. 169 (1875). Rich, chiefly deciduous, woods, thickets and ravines, St. John valley, southwestern New Brunswick, and central Maine to Minnesota, south to North Carolina, Tennessee and Oklahoma; also eastern Asia.

C. CANADENSIS Hill, Veg. Syst. x. t. 21, fig. 2 (1765). *C. intermedia* Ehrh. Beitr. iv. 42 (1789). Rich low woods, oftenest in alluvium, Bonaventure County to Lake St. John, Quebec, south to Nova Scotia, Cumberland County, Maine, Cheshire County, New Hampshire, and Berkshire County, Massachusetts; also in Europe.

[1] L. Sp. Pl. i. 9 (1753).

C. ALPINA L. Sp. Pl. i. 9 (1753). Cool woods, wet mossy openings, margins of streams, etc., southern Labrador to James Bay and northwestward to Alaska, southward through Newfoundland, eastern Canada, northern New England, northern New York, etc., and more locally to southern New England, Georgia, the Great Lake states, So. Dakota, etc.; also Eurasia.

GRAY HERBARIUM.

IS ASTER TARDIFLORUS A HYBRID?

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DURING the late summer of 1916, in the towns of Randolph, Gorham, and Jefferson, New Hampshire, I was on more than half-a-dozen occasions impressed by a blue-flowered *Aster* which I could not at once name. Its inflorescence at times suggested *A. cordifolius*, but the leaves were not cordate; the involucre was nearer to that of *A. puniceus*, but again the shape of the leaves failed to match. It was worthy of remark that the plant was in each instance solitary or appearing in but two or three specimens, while in each case *A. puniceus* and *A. cordifolius* were observed, usually in some abundance, near by. These facts led to the suspicion that one of the numerous hybrids of the genus had been found, and that *A. puniceus* and *A. cordifolius*, the two commonest and most generally distributed blue-flowered *Asters* of the region were its parents.[1]

But my interest was further aroused when the plants in question proved, upon analysis, to match exactly the description in Gray's Manual of *Aster tardiflorus* L., and when subsequent comparison at the Gray Herbarium confirmed this diagnosis. The query, then, naturally arises whether *A. tardiflorus* is not a hybrid. Its intermediate characters can be more clearly indicated by the following résumé (compiled from the Manual descriptions of the three species I have mentioned).[2]

[1] The only other blue-flowered Asters known in the region are *A. macrophyllus* L., *A. radula* Ait., *A. foliaceus* Lindl., and *A. novi-belgii* L. The first two of these bear no resemblance to the plants in question, and the last two are of very local distribution and unknown in the neighborhood of most of the stations for the supposed hybrid.

[2] Points not noted in the Manual are enclosed in brackets.